DOCUMENT RESUME

ED 150 308 CE 014 392

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TITLE Evaluation of an Automated Instruction Shorthand Program.
PUB DATE [75]
NOTE 8p.; Best copy available

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Academic Achievement; Business Education; Business Skills; Classroom Research; Conventional Instruction; Curriculum Evaluation; Dropout Rate; Films; Individualized Instruction; *Individualized Programs; Laboratory Schools; Methods Research; *Multimedia Instruction; *Program Effectiveness; Senior High Schools; Skill Development; *Stenography; Student Attitudes; Tape Recordings; Teacher Attitudes; Teaching Methods
IDENTIFIERS *Automated Instruction Shorthand System; Gregg Shorthand

ABSTRACT

A field test of the Automated Instruction Shorthand System (Random House) was conducted at the University of Northern Colorado Laboratory School to determine its suitability for future implementation in Colorado schools. The multisensory instructional program conditions the rapid recall of Gregg symbols through use of animated sound color films and audio/tutorial cassettes and allows for individualization of instruction. Students in the shorthand class at the laboratory school were the experimental group (taught with the new system); those at Windsor High School were the control group (taught with traditional methods). Classes were of similar size and nearly matched in grade level and length of class period. All students were tested for retention of theory, speed and accuracy, and attitude toward the course. Neither group achieved the minimum performance of eighty words per minute with 95% accuracy. Overall performance on speed and accuracy for the control group was better than that of the experimental group. Definite conclusions were not reached because of the limited sample and numerous uncontrolled variables. Perceptions of the students and teacher involved with the new system suggest that its strengths include its individualization, visual stimuli, and the availability of theory instruction for remediation and review. Its major weakness is the lack of supplementary materials (exercises and tests). Implementation will require teacher training in individualized methods and their adaptation. Positive student attitudes and inconclusive evidence have determined the continued use and refinement of the system within the laboratory school. (JT)

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Evaluation of an Automated Instruction Shorthand Program

Jeanne E. Lipman

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Shorthand has traditionally been regarded as a skill of high value originally used in recording speeches and discussions, and more recently as a requirement for success in such business occupations as stenographers and secretaries. According to the U.S. Bureau of Labor Statistics, there are nearly 250,000 annual openings in stenography and secretarial positions.[5]

The majority of shorthand installations currently in existence in Colorado teach the Gregg method of symbol shorthand. A recent increase in the methods of speedwriting available has caused a decline in the number of schools willing to train students in symbol shorthand because of the difficulties many people have in retaining and becoming proficient in the skill. This exemplary project was proposed to examine an individualized method of teaching symbol shorthand in an effort to significantly reduce the problems normally attributed to traditional classroom training.

The Automated Instruction Shorthand System, marketed by Random House, Incorporated, is a multi-sensory instructional program that conditions the rapid recall of Gregg symbols. Through the use of animated sound color films and audio/tutorial cassettes, students respond to over 10,000 visual and auditory stimuli and develop an instant recall of Gregg symbols. As students develop a comprehensive memory bank, they gradually respond to dictation without dependence on visuals.

The system is designed to allow the student to succeed at a speed that is most comfortable to his/her abilities and leaves the instructor free to diagnose individual performance and to prescribe remedial assistance where needed. It is believed the individualization will increase motivation and reduce the rate of attrition in shorthand classes.

The Program's five basic learning modes include ten film lessons that introduce all the Gregg theory concepts, and five audio-instruction lessons that cover the balance of brief forms and word beginnings and endings not presented on film. Fifteen audio-reinforcement lessons review all material presented in the instructional films and tapes and introduce additional brief forms and phrases. Fourteen audio-cumulative reinforcement lessons reinforce all the material presented in the previous lessons. Two audio-review lessons provide diagnostic exercises designed to ascertain memory retention of the objectives.

Hardware included projectors, screen, mini-theaters, cassette playback units, and headsets. Software included ten color motion picture film cartridges, cassette tapes and student program guides.

Since no other school in Colorado has an automated instruction installation, this program can be used for (1) introduction of University Business Education majors to this method of teaching, (2) demonstration of this program to Business Teachers in Colorado through visitation and inservice types of activities, and (3) research comparing methods of instruction. The method itself is individualized so multi-level activities can be accommodated in the classroom at one time. The program can be tailored to the specific needs of the beginning student and those who are in need of remedial instruction. The approach will provide a success oriented program that allows special accommodation for the low-ability, disadvantaged, poorly motivated, and special needs students to develop skills and enhance their self-image by giving them a chance to succeed through self-paced programs.

History and Related Information

The study of shorthand consists of a complex mixture of learning behaviors including cognitive, effective, and psychomotor as indicated by Reese and Smith in their monograph. Cognitively it is similar to the learning of any language.

Jeanne E. Lipman is a Supervisor and Instructor in Secondary Vocational Business at the Laboratory School of the University of Northern Colorado. *A Project Coordinator site expresses appreciation to Mrs. Karen Roesler, Business and Office Education Instructor, all the shorthand students at Windsor High School, Dr. Ken Frisbie, Director of the Laboratory School, and the students at the Laboratory School who studied under the Automated Instruction System for their participation in this project.*

A special thanks goes to Dr. Ken Spooner and his University of Northern Colorado Project Evaluation team for their assistance and evaluation of the project. Without the participation of all these people and the support of the State Board for Community Colleges and Occupational Education, this project would not have been possible.

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As a motor skill it requires mental and physical coordination for success. Throughout these learning characteristics are influences not the least of which is motivation. Students find a challenge, and often frustration, in mastering shorthand and teachers constantly look for ways to simplify and make more efficient the shorthand learning/skillbuilding activities.[4]

Contributors to successful performance are the student, the shorthand system, the teacher, and materials of instruction. The student and the shorthand system are relatively fixed in the learning process. Therefore, problems of learning must be treated by adapting the teacher, through improved methodology, and the materials, through improved implementation and supplementation.[4]

Among the problems relating to the instruction of shorthand and student success are the inability to retain material after it is learned, failure to reach expected standards of performance, and the dropout failure rate.[4] Since the primary justification for teaching shorthand is for employment in stenographic positions, the proof of a shorthand system is in the capability of those taught to demonstrate marketable transcription skills.[2] This frequently must be done in one year of instruction. Thus the question of when to introduce transcription becomes a primary consideration for developing the skill.[1] Minimum achievement of 80 wpm for three minutes of dictation at a 95% accuracy level becomes a key factor in determining the system to be taught. The alternative method (Automated Instruction) presents a widely used system of shorthand in less time than traditional classroom techniques allowing for the introduction of transcription skills much sooner than normally recommended. The conditioned-response approach further enhances retention of material as the student sees, hears, and reacts to the shorthand theory, in effect memorizing the principles. The media further provides the opportunity for remediations at any time throughout the instructional period.

The type of student enrolling in shorthand classes has changed in recent years. Since it is not possible to have control over enrollment, learning packages must be devised to assist students to succeed.[1] It is estimated that as high as 50% of the students taking shorthand will fail or drop out. Statistics show that shorthand has the highest attrition rate of any school subject.[4] The method and materials of instruction therefore become a prime consideration in student motivation and success.

Research studies relating to the Automated Instruction Shorthand Program are limited. Joan S. Briggaman, Business Education Consultant for the Connecticut State Department of Education, and co-author of the Automated Instruction Student Guide has indicated some degree of success with this type of instruction both in industry and classroom settings. Since there are no other installations in the Mountain West, these research results and the project will be used as a hands-on demonstration, training station for Colorado schools.

Goals and Objectives

The purpose of this proposal is to add the Automated Instruction Shorthand System to the currently established project testing the Automated Instruction Total Touch Typing System at the University of Northern Colorado Laboratory School. Currently the enrollment in shorthand at the Laboratory school is below average for the size of the school, and the new program will provide greater flexibility for students to enter the course.

This individualized method of instruction will lower the attrition rate in symbol shorthand classes and provide students with a skill that traditionally leads to greater speed and accuracy than any other method of speed writing currently being taught. The existing hardware in the typing project makes implementation automatic with no additional hardware needed.

The project will test the Automated Instruction Shorthand System for future consideration of implementation in schools throughout Colorado. There are several questions relating to this purpose which this research will address:

1. Does the automated shorthand system significantly reduce the time it takes to learn shorthand over other types of instructional methods?
2. Does the automated instructional shorthand system increase or maintain a high degree of accuracy while increasing speed?
3. Does the automated instructional shorthand system improve retention of previous skill and speed achievements?
4. Does the system significantly reduce the attrition rate normally found in symbol shorthand classes?
5. How do students perceive the automated shorthand system?
6. What type of in-service would have to be delivered in order to implement an automated system of instruction for shorthand?
7. What pre-service consideration must be given so that teachers graduating can implement and maintain an automated shorthand system?
8. What types of instructional experiences should be provided teachers in training, utilizing the Laboratory School setting and their instructional methods?
9. What modifications are necessary in order to fit the system into classrooms within Colorado?

Project Design and Procedures

During the 1975 - 1976 school year, an exemplary project was implemented at the Laboratory School to develop a program in Vocational Business and Office Education. Initially the program was to serve as a model for middle-sized schools in Colorado. Part of the first year's proposal included a field test of the Automated Instruction Total Touch Typing System to determine the effectiveness of an alternative method of teaching typewriting skills.

Among the findings of this project was the obvious flexibility that it provided for schools with otherwise limited capabilities--space, number of faculty members, and scheduling difficulties. The program enrollments more than doubled during the first year of the project.

During the spring of 1976, members of the project advisory committee, the staff and administration of the Laboratory School, and the State Supervisor for Business and Office Education made the decision to include a field test of the Automated Instruction Shorthand System during the 1976 - 1977 school year.

The program was designed to help students in the Laboratory School accomplish work competency skills competitively with students in similar training programs in a shorter period of time with assistance from the Automated Instruction techniques. Students must have skills which will help them to compete for jobs. The middle-sized school can further provide

vocational opportunities to the students which are competitive with larger schools. The significance of the research to Colorado schools is in the fact that the thorough testing of an instructional system will be accomplished prior to future implementation into vocational programs.

A major consideration of the project was to allow more flexibility to students enrolled in a shorthand program in an effort to significantly reduce the attrition rate that iswidespread throughout the country. Normally the attrition is attributable not to the Shorthand System but to the method of instruction and the ability of the program to retain the students' motivation. Students in the shorthand class at the Laboratory School were designated as the experimental group receiving instruction from the Automated Instruction System. Students from Windsor High School in Windsor, Colorado, enrolled in the shorthand I class were designated as the control group. Both classes were of similar size and nearly matched in grade level and length of class period. All students were tested, although results reported are from a random selection of students in each class.

The instructor for the control group was a qualified business and office education teacher. The textbook utilized first semester was *Gregg Shorthand, Functional Method*, Diamond Jubilee Series, Gregg Publishing Division, McGraw-Hill Book Company, Incorporated, Copyright 1963. The second semester text was *Gregg Dictation*, Diamond Jubilee Series, Copyright 1963.

The experimental group studied the Automated Instruction Shorthand Program during the first semester. *Gregg Dictation*, Second Edition, Copyright 1971, was utilized second semester. The project coordinator was the instructor.

Students from both the control group and experimental group were tested on theory only during the first 18 weeks of instruction. Due to the individualization of the Automated Instruction System, students in the experimental group were able to move through the program at varying speeds according to their abilities and therefore, testing the entire class at given times was difficult. Furthermore, the Automated Instruction System, although designed to teach Gregg Symbol Shorthand, is not correlated to the Gregg textbooks. Standardized tests were not available that could be used for both groups until all the theory was learned. The Gregg testing program was not suitable because of the lack of correlation between programs. It was decided that testing would be done only after all the theory was learned and that tests would be designed by the project coordinator in a similar format as Gregg theory tests, but using different words, phrases, and brief forms. Both groups were given the same tests on which average scores of accuracy have been recorded and will be reported in the results section of this paper.

Students were tested for retention of material over a two-week vacation period by taking a test prior to and immediately following the break. The test included 25 words and 25 brief forms selected randomly and ten short sentences to write or transcribe. Results of the transcription were not included in the research during this semester. The final theory test was given at the end of the first 18 weeks of instruction. This test included 100 words and phrases, 100 brief forms, and a written letter to be transcribed. Again the transcription was not included in the results. On all theory tests, average accuracy was reported.

During the second semester of instruction, both groups were tested twice on timed dictation--at the end of 27 weeks and at the end of 36 weeks. The dictation for the first production test was taken from *Transcribing Speed Studies*, Condon, Condon, and Lloyd; Gregg and Community College Division, McGraw-Hill Book Company; Copyright 1974. Letters were dictated at 40, 50, and 60 words per minute for three minutes. Average speed and accuracy scores are reported separately. The final test was taken from *Gregg Shorthand*, Diamond Jubilee Series, Gregg Division, McGraw-Hill Book Company, Copyright 1965. Dictation was given at 50, 60, 70, and 80 words per minute for three minutes.

Written business communications contain a syllabic intensity (SI) of approximately 1.50 and an average word length (AWL) of approximately 6.0. The materials selected contained an average syllabic intensity of 1.35; 6.3 for average word length. Dictation was selected randomly within the range that met requirements for business communications which might be encountered by students in job situations.

Minimum requirements for positions involving shorthand skill are 80 words per minute with 95% accuracy. Due to the large number of students who enter the job market after only one year of shorthand, this minimum standard can be considered to be the terminal performance level of a first year shorthand class.[6] Since norms were not available for comparison, results will be interpreted in terms of these standards as identified.

Shorthand is an elective course in both schools. The experimental group began with nine students and the control group began with 16 students. All were beginners, but in order to make comparisons on skill development, eight were randomly selected from each group for the study with an attempt to match age, grade level, and sex. Due to the attrition factor, the selection was not made until it was determined that students would complete the course.

An attitude scale was given to the student in both groups to gain perceptions of the shorthand classes. The scale was adapted from a study by Neidt[3] in which the scale measured student attitudes toward methods of instruction, content of instruction, and course expectations. The general format of Neidt's scale was not changed; only items that referred to a specific course title were edited.

Additional reactions were obtained from students in the experimental group using the Laboratory School Teacher and Course Evaluation form.

Results and Accomplishments

Due to the small sample (eight) used for comparison in each group, the results of the skill development are not statistically significant. Furthermore, a number of variables have made the results impossible to interpret. Results are available on speed and accuracy performance, retention over a period of vacation, and students' and teachers' perceptions of the Automated Instruction Shorthand System. Implications and recommendations will not be indicated based on these results.

The research could not be conducted under controlled experimental conditions. Several factors influenced this--the classes were taught by two different instructors, the length of instruction was different for the two schools, the study was limited to a small geographic area making it difficult to match IQ, classrooms, age, grade level, physical characteristics, and previous instruction, and the sample size was too small to make the findings conclusive. Interpretation of the data must be considered limited in view of these factors. The results are identified in the same order as this report's list of objectives.

TABLE 1. Comparison of speed development and accuracy.

	18th Week*		27th Week		36th Week	
	Control Group	Experimental Group	Control Group	Experimental Group	Control Group	Experimental Group
Speed (Words Per Minute)	-----	-----	40	40	60	50
Accuracy (Average Errors)	80.38%	80.00%	86.86%	95.00%	94.25%	78.43%

Scores reported are averages for the matched group.
*Objective test included shorthand theory only, not dictation.

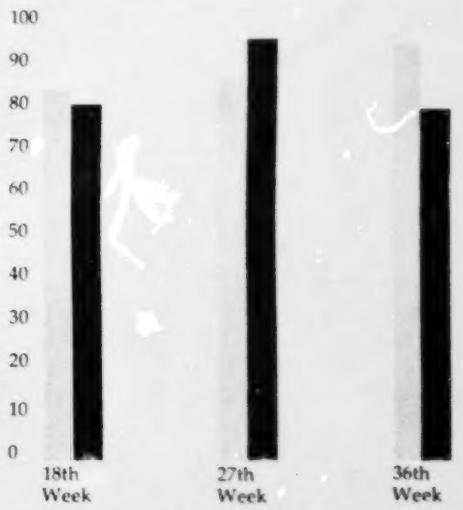
Theoretically, the Automated Instruction Shorthand Program is designed to be completed in 41 hours of instruction, or approximately one nine-week quarter of classes. This of course is dependent upon student ability to learn the theory concepts, self-discipline to conscientiously study the program in the time periods allowed, and motivation to excel in the skill. In reality, the student often feels it is important to do difficult lessons over or review past theory for better retention. Traditional classrooms normally require 18 weeks (one semester) of instruction to completely learn the Gregg method. One student in the experimental group completed the program in 16 weeks, two completed it in 18 weeks, one in 19 weeks, one in 21 weeks, two in 22 weeks, and one in 27 weeks. Students in the control group proceeded to dictation at the beginning of the second semester. Only four students in the experimental group had completed all the theory at that time and could begin instruction in the Gregg text.

Eight students from the experimental group were matched with eight students from the control group as closely as possible in age, grade level, and sex. Table 1 and the following graphs summarize the average speed (words per minute) on three minutes of dictation at speeds of 40 words per minute to 80 words per minute, and the average accuracy (expressed as a percent of total words). In interpreting the speed on production tests, the mode is used to determine class achievement at the end of 27 weeks of instruction and 36 weeks of instruction.

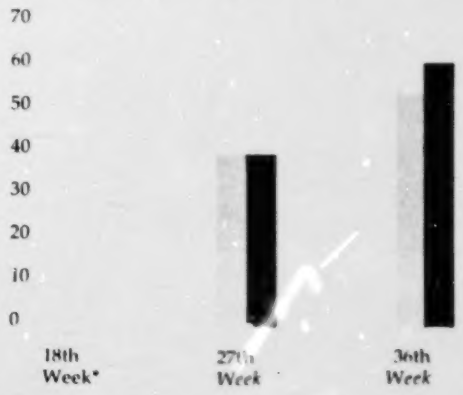
Production test scores indicate that the experimental group all transcribed at 40 words per minute, while the control group had four students transcribe at 40 words per minute, two at 50 words per minute, and one at 60 words per minute after 27 weeks. At the end of 36 weeks, however, the control group had increased to an average of 60 words per minute while the experimental group had only increased to an average of 50 words per minute. As indicated in the test scores, three students in the control group transcribed at 50 words per minute, three at 60 words per minute, two at 70 words per minute, and one who transcribed at 70 and 80 words per minute. Accuracy on the 80 wpm transcription was not at a 95% level; therefore, the best transcription was selected for comparison. In the experimental group, four students transcribed at 50 words per minute, one at 60 words per minute, and two at 70 words per minute.

Accuracy scores reflect an overall higher degree for the control group than for the experimental group. At the end of 18 weeks of instruction, the control group performed slightly better than the experimental group (.38%). This might indicate

Summary of Group Average Accuracy



Summary of Group Average Speed



*Objective Test included shorthand theory only, not dictation.

=Control Group =Experimental Group

Production Test Scores: 36 Weeks' Instruction

Control Group

Student Number	18th Week* Speed*	18th Week* Accuracy+ %	27th Week Speed*	27th Week Accuracy+ %	36th Week Speed*	36th Week Accuracy+ %
C1	--	85	40	92	60	99
C2	--	64	40	78	50	93
C3	--	93	40	98	50	99
C4	--	89	60	97	70	98
C5	--	89	50	97	60	98
C6	--	71	50	87	60	95
C7	--	60	40	59	50	80
C8	--	92	--	--	70	92

Experimental Group

E1	--	82	40	88	50	49
E2	--	85	40	98	70	90
E3	--	88	40	100	70	94
E4	--	66	--	--	--	--
E5	--	82	40	98	50	63
E6	--	83	40	95	60	74
E7	--	86	40	92	50	95
E8			68	40	94	50

Dictation Words Per Minute
+Expressed as a percentage

that the instruction of theory for the individualized system is comparable to Gregg's method since only two of the students in the experimental group had completed the program and errors most likely occurred on theory that had not been learned. Accuracy averages on the first production test indicated a level that was considerably higher for the experimental group. In contrast, accuracy after 36 weeks of instruction had increased for the control group while showing a dramatic decrease for the experimental group. Several factors could have contributed to this phenomenon; however, similar results are outlined later in this report in relation to retention of material.

Three-Minute Skill Development
Comparison of Increase: 27th Week With 36th Week

	Speed	Accuracy
Control	+20 wpm	+ 7.39%
Experimental	+10 wpm	-16.57%

*Expressed in averages.

Neither group terminated the course at the minimum performance level of 80 words per minute with 95% accuracy. The results showed that the control group increased speed while also increasing accuracy. The experimental group did increase speed, but not to the degree the control group did; their accuracy, however, decreased. Overall performance on speed and accuracy for the control group was better than that of the experimental group.

Table 2 and the summary that follows shows the average accuracy retention over a two-week vacation period. Students were given the same test prior to and immediately after the break. Results show the control group to have decreased in retention by only 1.25% while the experimental group decreased by 11.57% of the total points on the test. At this point, students were not able to be tested for speed retention. No results are available to determine the degree of retention for speed or comparison between the two groups.

Was the Automated Instruction Shorthand System effective in developing shorthand skills? With the limited sample that was available and the numerous variables that could affect the outcomes, definite conclusions cannot be reached. Considerably more and extensive research would need to be conducted to show significant results in skill development.

However the perceptions of the students and teacher who took part in the individualized method can identify some advantages and disadvantages that exist with the program.

Most students responded positively to the type of instruction. They generally agreed that the major strength was in the individualization, allowing them to move at their own speed, not being influenced by having to compete with others in the class. In contrast, the teacher feels this to be both an advantage and disadvantage. In order for the students to progress effectively in the program, it is still necessary to provide a suggested time-line for completion and an expected standard of performance, neither of which is built into the system. However, due to the individualization, the teacher can much better determine progress and is always available for assistance and diagnostic help.

Another advantage of this type of program is the concept of seeing words being written on the films. Students become more aware of proportions and directions in relation to word formulation. They are encouraged to write, not draw, and are further required to read their own work. Each student develops a shorthand style and is not intimidated by perfect outlines.

The major weakness of the program is the lack of supplementary material. Students felt that some type of dictation other than just words should be introduced on the tapes. This was a very time-consuming disadvantage for the instructor as the company provides no supplementary materials for extra practice or homework. Since the instruction is in no way correlated to the Gregg theory textbook, and no company provides dictation tapes that can be used until all theory has been learned, it becomes the responsiblity of the instructor to develop such materials as word lists, short sentences, English usage reviews, and other activities that will supplement the program and assist the students in their instruction. Students indicated a need for this type of extra material to assist them in applying the theory prior to dictation, as a supplement to proper word formulation, and to give them more confidence to perform their skill in a work situation. They further felt it would enable them to read shorthand outlines from other textbooks and sources more easily.

A weakness relating directly to the theory presented in the program should be identified at this point. Automated Instruction adequately deals with word formation, brief forms, phrasing, and certain special applications; however, the instruction of proper nouns and names is limited, and there is no instruction in cities, states, and geographical locations and abbreviations. Some special blends are also not covered by the program.

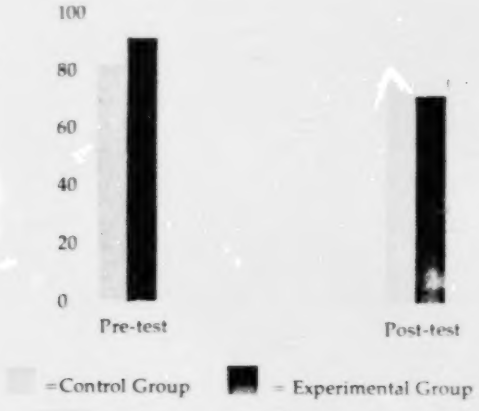
Having been originally designed for industry and independent adult education, there is no testing program provided--the two audio review lessons provide a limited measure of the students' skill development. Appropriate tests for public school use need to be designed and made available as a basic element of the program.

TABLE 2. Comparison of retention scores.

	Pre-test		Post-test	
	Control Group	Experimental Group	Control Group	Experimental Group
Average Accuracy (Theory Recognition)	80.50%	88.57%	79.25%	77.00%

Retention tested prior to and immediately following two-week Christmas vacation period.

Summary of Group Average Retention



Retention Test Scores*

Control group

Student No.	Pre-test	Post-test
C1	78	80
C2	60	58
C3	86	86
C4	96	94
C5	90	86
C6	74	78
C7	64	60
C8	96	92

Experimental group

E1	--	62
E2	90	76
E3	98	92
E4	70	52
E5	88	90
E6	92	84
E7	92	78
E8	90	82

*Expressed as a percent of total correct responses.

The teacher felt the terminal performance of the students could be attributed to the lack of supplementary materials early in the program and the difficulties of adjusting to the Gregg textbook during the dictation/transcription phase of instruction. A definite advantage was the availability of the theory instruction for remediation and review. Individual attention can be given to each student and different instructional processes can be carried on in the classroom at one time with little or no disturbance.

The rate of attrition for each of the groups is significant. The experimental group began with nine students and lost one who dropped out of school. The other eight remained in the program the entire year. This gave an attrition rate of 11%. The control group began with 16 students. One dropped out of school and three dropped the class at the end of the first semester. This was an attrition rate of 25%. Students in both groups remained positive about their classes throughout the year. It is inconclusive as to whether the lower attrition could be directly attributed to the Automated Instruction Program, and extended research would be needed to substantiate this type of data.

Implications for the in-service component of this project necessitate hands-on activities to help educators with implementation of the Automated Instruction System in their schools. The Laboratory School setting provides a vehicle for training Colorado business education instructors in this implementation and effective utilization. University of Northern Colorado is an approved institution for vocational training and credentialing in Colorado, and the staff at the Laboratory School works in close cooperation with the Vocational Teacher Education Staff of the College of Business. A one-credit hour workshop in Individualizing of instruction is being given during the 1977 summer quarter to include both the shorthand and typing programs using the equipment and materials from the projects. In addition, three 3-hour workshops will be presented at the 1977 Colorado Vocational Association Convention in August by transporting participants to the Laboratory School facilities for hands-on experiences.

The Laboratory School also provides pre-service clinical experience activities to students in business education prior to their student teaching. EDFE-363: *Introduction to Teaching Business* offers students two quarter hours of instruction in working with students at the secondary level and getting hands-on experiences with the Automated Instruction Systems. One student worked with the Shorthand class during the 1977 spring quarter and was able to develop realistic opinions concerning the individualization of instruction. The Instructor of the Project at the Laboratory School gave a special presentation to students studying Methods of Shorthand in order to inform them of the existence of the installation and explain the basic concepts of an individualized system. Information regarding the field experience opportunities were made available to them at that time.

Notification of the activities carried on in the project were publicized throughout the year. Articles appeared in the *Greeley Tribune*, the *University of Northern Colorado Mirror*, the Colorado Business Education Association Newsletter *PEEKS*, and the BOE Newsletter from the State Board. During the 1977 Midyear Education Conference at the University of Northern Colorado, a reception was held for all Business and Distributive Education participants to view the equipment and materials and discuss upcoming events with the instructor.

Modifications and/or additions to the Automated Instruction Shorthand System will be communicated directly to the publisher, as will additional materials that may be generated as a result of the utilization of this program.

Information concerning the Automated Instruction Programs may be obtained by contacting the publishers. This report and all results of the project will be disseminated by the State Board for Community Colleges and Occupational Education through the State Vocational Curriculum Library in Fort Collins, Colorado.

Evaluation, Conclusions, Implications, Recommendations and a Closing Remark

Dr. Kendrick Spooner and Mrs. Patty Ryan of the University of Northern Colorado Project Evaluation Department conducted site visits on February 10, 1977, and April 28, 1977, to assess the project's progress. Consultations with the project coordinator occurred throughout the term of the project. Responsibilities included progress of program management, staff development, instructional accomplishments, participant interviews, and a summary of their findings. Their hard work and assistance in evaluating the project are greatly appreciated.

The Automated Instruction Shorthand System has provided the opportunity for students at the Laboratory School to develop a saleable skill for future employment. The system allows for individual progress and provides students who have completed the program with a means of remediation and review throughout their continued vocational training. It is possible to conduct multi-level activities in the same classroom for students who desire increased instruction in skill development--Shorthand I and Shorthand II students could effectively be taught together due to the individualized nature of the program.

Some implications for the future include greater flexibility for students in scheduling, increased enrollments due to multi-level capabilities, training stations for pre-service teachers in individualized methods of instruction, and additional hands-on courses to deliver the system to Colorado business educators.

The Automated Instruction System can be adapted to any size school. The greatest limitation would appear to be that of financial constraints. It is recommended that the program be carefully reviewed by interested persons, and an effort be made to secure all information available about its effective utilization. Training in the procedures and techniques of adopting an individualized program and administering it efficiently would be a prime requisite for interested instructors. Another important factor is that of time to adapt the system to current classroom settings, student populations, space restraints, scheduling problems, and school or department performance guidelines. Development of supplementary materials will also be necessary until such becomes available from the publisher or other sources.

The importance of the teacher in this or any other method of instruction cannot be overstated. Furthermore, the statistical results of this project cannot be considered significant in relation to the possibilities for student motivation and success. Skill development depends upon the combined efforts of the students, teachers, and available methods and materials to produce effective learning outcomes.

It has been a rewarding experience to work on this project. Individualization has the capability of reaching more students with different learning styles by providing a variety of instructional modes and activities in which the participants can become involved. The teacher becomes more important to the process than in many other methods--the human element more important to the process than in many other methods--the human element in multi-media, often impersonal educational systems. Guidance, diagnosing, attention to individual needs, and availability to assist students with the learning process combine with the system in an effort to make skill development more effective. Positive student attitudes and inconclusive evidence have determined the continued use and refinement of this system within the Laboratory School.

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